NF Draft AO Questions and Comments

1. Q. Where should detailed Basis Of Estimates (BOEs) be put? The current wording gives no obvious location other than as part of the 8-page cost narrative. If that is where they must be put, BOEs can only be high-level summaries and cannot include enough detail to provide real help to reviewers in validating costs estimates. If detailed and useful BOEs are required (e.g., to the WBS level used in Table B3), could you explicitly exempt BOEs from the page limits, as you have done for the schedule foldout (Rqmt B-40) and for Table B3 (Rqmt B-49)? The current wording of the draft AO leaves the proposer with two alternatives: (1) Follow the clearly stated page limits and omit BOE detail, or (2) include BOE detail and supporting cost data at the risk of violating the page limits.
   A. NASA is not requesting detailed BoEs for Step 1 proposals. NASA has concluded that additional details do not contribute to NASA's ability to evaluate the feasibility of a pre-Phase A project. The allocated page limit should be sufficient for justifying the proposed cost for a pre-Phase A project. The AO is making a deliberate effort not to require Phase A level details to be provided in the Step 1 proposal. Detailed BoEs will be requested for Step 2 Concept Study Reports. All proposers must follow the clearly stated page limits or risk having the proposal declared noncompliant.

2. Q. Under the "Network Science" mission concept, is the moon precluded as a possible target? What targets are allowed or not allowed?
   A. The Moon is precluded.

3. Comment: The wording of the "Trojan/Centaur Reconnaissance" concept description indicates that mission targets must include both a Trojan and a Centaur. A mission to both types of targets is very unlikely, given that RPS power is not allowed. Reword the description to allow missions that would characterize either a Trojan or a Centaur to be deemed responsive to the AO.
   A. The wording in the AO has been modified to allow proposals for missions to a Trojan, or a Centaur, or both.

4. Q: Requirement 18 asks for a description of the "mission architecture", and refers to Appendix B, Section F for more detail. This really isn't defined anywhere, and is subject to interpretation. Please provide a specific definition.
   A. A mission architecture is the summary level description of the over all approach to the mission in the context of achieving the science objectives including mission elements such as flight systems, instruments, high-level mission plan, high-level operations concept, etc.

5. Q. Launch Services – Would it be possible to specify baseline LV model numbers in the AO for clarification, or at least provide examples? Also, clarify how the cost credit for lower-class LV's corresponds to specific LV model numbers. Again, examples would help.

A: It is not possible to specify launch vehicle configurations at this time. Through 2012, NASA procures launch vehicles via the NASA Launch Services (NLS) contract; NF3 will be procured under the follow-on contract which is not in place yet. The AO contains performance ranges in the intermediate class that we felt were credible for the NF3 mission. The vehicles on the current NLS contract that support this intermediate performance class are the Falcon 9, the Delta IV, and the Atlas V. Due to the competitive nature of NLS, we find it best to only talk in terms of performance class until the mission actually procures the vehicle, which is about 3 years before launch. Which vehicle on the current NLS contract that can actually support a particular mission requirement set can be determined using the ELV performance web site referenced in the ELV Launch Services Information Summary letter. However, as stated in the AO, we discourage designing your spacecraft/mission to a specific launch vehicle, as that launch vehicle configuration cannot be guaranteed. The rationale for doing so must be compelling.

Due to the uncertainty in available launch vehicles several years from now and other uncertainty factors affecting launch vehicle costs, we chose to establish the performance ranges and associated cost credit "steps" primarily to isolate the spacecraft organization from these uncertainties while allowing adequate budgetary planning.

6. Comment: Section 7.4.4, Paragraph 3, first sentence - suggested wording change:
"…exercising the bridge phase option **on the selected** contract"
A. Wording in the AO has been modified.

7. Q. Must a NF PI be a U.S. citizen, assuming that PI has an established position within a U.S. institution?
A. No.

8. Q. Are there ITAR, *etc*., restrictions on non-US people working at U.S. institutions?
A. This is not an AO question. Please consult with your organization's legal staff for questions concerning your organization's compliance with U.S. export control laws under hypothetical work situations.

9. Q. Re the ELV Launch Services paragraph on page 40 of the Draft AO for New Frontiers 2009, what specifically is meant by "the standard (default) launch vehicle? Is the most capable (i.e., highest performance range) launch vehicle in the "intermediate performance class"? What configurations (if any) of the Delta IV launch vehicle fall into the standard default category.
A: It is not possible to specify the standard (default) launch vehicle configuration at this time. Through 2012, NASA procures launch vehicles via the NASA Launch Services (NLS) contract; NF3 will be procured under the follow-on contract which is not in place yet. In addition, due to the competitive nature of NLS, we find it best to only talk in terms of performance class until the mission actually procures the vehicle, which is about 3 years before launch. When we procure the launch vehicle for NF3, we will take the selected mission's requirement's and competitively select

from all available vehicles on our contract (at that time) that can credibly meet the requirements. However, the vehicle configuration (currently on contract) that can actually support a particular mission requirement set can be determined using the ELV performance web site referenced in the ELV Launch Services Information Summary letter. Please note that, as stated in the AO, we discourage designing your spacecraft/mission to a specific launch vehicle, as that launch vehicle configuration cannot be guaranteed. The rationale for doing so must be compelling.

10. Q. For the final AO version, please extract this information from the cited reference, ELV Launch Services Information Summary, which I cannot find anywhere, into an appendix in the AO.
    A: The ELV Launch Services Information Summary letter is on the NF3 website, under the Program Library. The web site will be reviewed for changes to increase ease in navigation.

11. Q. Must a Project Scientist or Project Systems Engineer be named in Step 1?
    A. There is no requirement in the AO to name the PS or PSE in a Step 1 proposal. There are clear requirements to name the PI (Requirement 33) and the PM (Requirement 34).

12. Q. Please define the term "key management team members" and what this entails.
    A. Key management team members are project leaders whose qualifications and experience are relevant and necessary to the success of the project. Key management team members are the PI, PM, PSE, and, where appropriate, PS and partner leads, and other roles as identified in the proposal.

13. Q. Requirement 37 states, "Proposals shall describe the qualifications and experience of the primary implementing institutions and demonstrate that they are commensurate with the technical and managerial needs of the proposed investigation." However, there is no traceability between this requirement and Appendix B. Where should this material be discussed in the proposal?
    A. Guidance has been added to Requirement B-42 in Appendix B.

14. Q. Does the exploded diagram in Req. B-59 (which really covers the hierarchy of contributions to the investigation) satisfy the above requirement in Req. 72 for "the flow of design requirements (potentially export controlled information) and hardware between U.S. and non-U.S. participants"? If not, where in the proposal should the information to satisfy the second half of Req. 72 be supplied?
    A. The AO states, "This description may take the form of a flow chart." Additional information should be included in Appendix J.4 of the proposal.

15. Q. Please clarify what a poorly-rated SEO will do to the Form B evaluation. Will such an SEO *lower* the Form B evaluation, or have no impact?
    A. This cannot be determined in advance. These can only be evaluated on a case-by-case basis.

16. Q. Section 7.4.3 states: “The PI-Managed Mission Cost will not increase by more than 20% from that in the Step 1 proposal to that in the Phase A Concept Study Report, and in any case will not exceed the PI-Managed Mission Cost cap.” NASA has previously removed this constraint from many past AOs, and there is no other reference to this constraint anywhere else in the AO, especially in Sec. 5.6 (Cost Requirements). Furthermore, this constraint is not described as a requirement (in the sense of being numbered). Is this a real requirement?
    A. This is a real policy that represents a real requirement for Phase A concept studies. However, it is not a requirement for Step 1 proposals. It is the practice of the simplified Standard AO not to repeat things.

17. Q. Part C2, Cost Element Definitions defines "Instruments" as - cost includes ... through delivery to spacecraft. Should the instrument cost also include post-delivery support and MO&DA costs associated with the instrument?
    A. Under review.

18. Q. Can student collaborations include the deployment of an instrument(s) or microsat(s)?
    A. Yes as long as they meet the requirements in Section 5.5.3. NASA has intentionally not constrained your ability to develop innovative student collaborations.

19. Q. Why does the AO require NF missions to be ‘Class B’? Is this consistent with other prior cost capped planetary missions in this cost range? By requiring the payload to be Class B, the AO is implicitly raising the cost and limiting the potential science return. A class B/C spec would allow selective decisions and trades that still result in a low risk mission within the cost constraints

20. Q. Clarify the intent of Requirement 1. The requirement to address the “majority of science objectives” is ambiguous and could be very misleading. If the intent is really to require each proposal to demonstrate that science return is optimized, then the AO should say so. The concern is that the word “majority” indicates a quantitative measure. A potential phrase that might be suggested is “proposals must demonstrate that sufficient science relevant to the stated goals can be addressed to warrant a New Frontiers class mission”
    A. The intent of Requirement 1 has been clarified.

21. Comment: The Venus objectives appear to go beyond the goal of key science objectives bleed well into implementation requirements. We suggest this be corrected.
    A. The wording in the AO has been modified to remove implementation requirements.

22. Q. Clarify Requirement 79 "Proposals shall propose a launch readiness date within a window beginning in late CY 2016 and ending no later than the end of CY 2018,

optimized according to target." Are "late" and "end of" defined as the period from September 1st to December 30/31st?
A. By definition, the end of a Calendar Year is December 31st. "Late" has no precise definition, but your interpretation is reasonable.

23. Q. If a mission can be consistent with NASA's annual funding for New Frontiers and launch prior to 2016, would that earlier launch date be acceptable?
A. Probably not. The stated launch window is driven by anticipated availability of funding for acquisition of launch service during this period.

24. Q. Is the schedule foldout limited to 1 page, as the text suggests, or can it be multiple pages (with no impact on the total page count) as the table on page B-2 suggests?
A. Table B-2 explicitly states that there is no limit on the number of pages that may be used for the schedule foldout(s). No implicit limit to one page is intended in Requirement B-40. Note that the requirements on schedule detail have been deliberately limited to what is reasonable for a project in early formulation.

25. Comment: The percentage power margin example on page B-16 is not consistent with the definitions and equations given there, although the percentage mass margin example is. The percentage power margin should be 25/175=14.2%, not 25/200=12.5%
A. This has been corrected in the AO.

26. Q. If the AO is released later than February 2009, will the time periods between major milestones (section 3, page 10) remain as stated?
A. Although NASA reserves the right to adjust the major milestones as appropriate based on the AO release date, the time periods between major milestones in the Draft AO are our current best estimates.

27. Q. Are Step 1 proposals required to address how the proposal team will meet the requirements noted in the policies noted in sections 4.1.1, 4.1.2, and 4.1.3, or is the intent only that the proposal team confirm that their proposed approach will be compliant with the policies (specific details left to the Step 2 proposal)?
A. Section 4.1 states explicitly "The following policies impose requirements on selected missions, for which planning may need to be considered and described as part of the proposal process. These requirements are not levied directly on Step 1 proposals." All requirements placed on Step 1 proposals are explicitly called out and numbered. We really mean that.

28. Q. Please define "essential degree of insight" and "essential oversight" as stated in section 4.1.2 - "...NASA intends to maintain an essential degree of insight into mission development; NASA will exercise essential oversight to ensure that the implementation is responsive to NASA requirements and constraints." Of key concern is how the insight and oversight will be implemented and the cost/schedule impact.

A: The New Frontiers Program Office at Marshall Space Flight Center will oversee projects to ensure that NASA requirements are met. Some of these requirements are found in NPR 7120.5D and the New Frontiers Program quality/mission assurance document. The Program Office uses existing institutional processes and reviews to maintain cognizance of project status whenever possible, to minimize additional reporting imposed on projects. Roles and responsibilities for SMD, the program office, and the principle investigator, as well as project reporting requirements, are defined in the New Frontiers Program Plan.

29. Q. Please explain how the /New Frontiers Program Safety and Mission Assurance Guidelines and Requirements/ document is to be addressed in the Step 1 proposals, given the statement in section 4.1.2 - "Although this document may impose requirements on selected investigations, it does not impose requirements, either implicitly or explicitly, on Step-1 proposals.
A. Section 5.2.9 states, "New Frontiers missions selected are required to meet the requirements for safety, reliability, and mission assurance in the *New Frontiers Program Safety and Mission Assurance Guidelines and Requirements* document." Requirement B-36 states that Step 1 proposals must address the mission assurance approach. Proposals should not parrot back the NF mission assurance document. Rather, they should describe the mission assurance approach and make clear that sufficient resources (management, personnel, cost, schedule) are available to meet the requirements.

30. Q. Could a summary table be provided explicitly stating what the driving requirements are associated with being deemed a Category 2 mission with Class B payloads (section 4.1.3)? Such a table would minimize (eliminate?) any potential issues associated with interpreting NPR 7120.5D and NPR 8705.4.
A. Projects are required to meet the requirements in NPR 7120.5D and NPR 8705.4. Any driving requirements that might exist are spelled out in those NPRs. The details of how the project will meet these requirements will be spelled out in the Project Plan. These issues are commonly dealt with in Phase B. The AO is making a deliberate effort to not require Phase B issues to be worked out for the Step 1 proposal.

31. Q. Are "Performance Metrics" the same as Level 1 requirements? If not, how are they different?
A. No. Performance metrics are a multi-party agreement between the New Frontiers Program Office, the PI institution, the project management institution, and other major partners. Level 1 requirements are agreements between the project and NASA Headquarters.

32. Q, Is SAIC the only contractor that is precluded from participating in the support of proposals submitted in response to the NF AO?
A. TBD.

33. Q. Section 4.5.1 leaves open the question of whether a selected mission will or will not receive IV&V services. Should Step-1 proposals include the mission team's costs associated with interacting with the NASA IV&V Facility personnel?
A. Yes.

34. Q. Is the "...proposed cost of the mission." associated with the Threshold Science Mission (section 5.1.4) defined as the mission cost arrived at after exercising all mission descopes associated with arriving at the Threshold Science?
A. NASA has not requested the proposed cost of the Threshold Science Mission. NASA has requested (i) the proposed cost of the Baseline Science Mission (Requirement 52), (ii) the definition of the Threshold Science Mission (Requirement 8), and (iii) the cost savings (or cost avoidance) associated with descoping from the Baseline Science Mission to the Threshold Science Mission (Requirement 40).

35. Q. Will the NASA Planetary Protection Officer provide definitive direction relative to "...special planetary protection requirements." (Requirements 10 and 11) prior to the Step-1 proposal due date in order to allow for costing of any such requirements?
A. TBD

36. Q. Will there be a designated NASA point of contact to provide definitive determinations for what is meant by the statement "...clearly within the capabilities and capacities..." (Section 5.2.6)
A. Yes. See the *NASA's Mission Operations and Communications Services* document, which will be posted soon in the Program Library.

37. Q. Please confirm that NASA intends to approve the Project Manager at 'each' transition to the next Phase of implementation (Section 5.3.2)
A. The AO clearly states "NASA will approve the PM at each transition to the next Phase of implementation as part of the KDP approval process." Yes, we really mean what we say.

38. Q: Can you provide examples of acceptable means of demonstrating that "...subcontracting opportunities are not reasonably available in the performance of the Phase A concept studies..." (Section 5.5.1)
A. NASA cannot write your proposal for you. You need to consult with your own procurement office for advice on doing this.

39. Q. Are the 'factors' noted in sections 7.2.2, 7.2.3, and 7.2.4 all weighted equally within their respective areas? If not, what is the weighting?
A. There is no weighting. There is no formula. All factors are considered for categorization and selection. A weakness in any one area may be sufficient reason not to select a proposal, or a proposal may be selected with weaknesses in several areas.

40. Q. Step 1 proposals are not required to include SOWs and cost and pricing data for Phase A Concept Studies (Section 7.4.1). Does this mean that projects selected for

phase A must provide these after selection and that they are required before NASA can provide funds and contracts for Phase-A?
A. Yes. The AO clearly states "Proposals are not required to include SOWs and cost and pricing data for Phase A Concept Studies and subsequent phases. These will be required only for investigations that are selected at the outcome of the Step-1 competition. If more than one contractual arrangement between NASA and the proposing team is required, a separate SOW is required for each organization."

41. Q. Is there any possibility that NASA will not require a site visit to review the final concept study results with the investigators (Section 7.4.3)?
A. Although NASA reserves the right to modify the downselect process as necessary (the AO clearly states "NASA may request presentations and/or site visits to review the final concept study results with the investigators."), NASA believes that a project as large and complex as a New Frontiers mission requires maximum insight into the proposed development plan and that insight is improved through site visits.

42. Q. Appendix B, Proposal Structure and Page Limits table – Can we get confirmation that the maximum possible page count for sections D through G is 55 pages?
A. The AO has been modified to allow 30 pages for sections D and E, and 35 pages for sections F and G.

43. Please explain why foldouts are being counted as two pages. This is a change from previous mission AOs.
A. Although foldouts are counted as two pages, there is no limit on the number of foldouts. It is up to the judgment of each proposal team to make the best use of the limited number of pages.

44. Comment: Change requirement B-6 to allow for three separate searchable .pdf files, *viz*., main proposal, all appendices, cost tables.
A. The AO has been modified.

45. Q. Requirement B-35 asks for the Mission Operations Element of Telecommunications, Tracking and Navigation in Requirement B-35, which includes parameters such as downlink frequency/periods/capacities/margins. Are there no specific AO requirements on RF parameters and link analyses?
A. The AO clearly states the requirements for telecom parameters in Requirement B-35.

46. Comment: Step 2 funding should be increased to about 1% of the Total Mission Cost (i.e., to $6.5 million per step 2 concept study) and the concept study period should be increased to about 18 months, to keep the number of full-time equivalents at about 15. Teams have fewer opportunities to use the best people within their organizations to execute the concept studies if the time periods are shorter.

47. Comment: Increase evaluation time (even a few days for the creation of the initial forms B and C would be valuable) and the corresponding evaluation costs. The 3 to 1 step 2 over-selection factor seems optimal. If it is reduced to 2 to 1 then I believe that it is even more important to off-set this procurement risk with more step 2 funding, greater page allocations and more step 1 evaluation time.

48. Comment: Each requirement should: (i) contain one idea; (ii) be clear, concise and unambiguous; (iii) be verifiable; and (iv) be independent of implementation. In addition, providing good examples will help proposal teams to establish good requirements techniques at the beginning of their projects – a significant benefit since poor requirement practices are one of the most common problems on flight projects.

49. Comment: Draft level-1 requirements should be required for step 1 proposals. The level-1 requirements are the basis for what is being proposed – the basis for cost, schedule, risk assessments and science performance. Changes to the draft level 1 requirements in step 2 should be required to be addressed in the CSR.

50. Comment: Provide a real example of a good science traceability matrix – instead of or in addition to the generic B1 and B2 tables. There must be several good examples from NASA missions that have flown. In addition, the implicit implementation trades that were done to complete table B2 (the mission, spacecraft, ground and operations system requirements) should be identified and the trade study plans for step 2 should be described.

51. Comment: Considerable ambiguity remains with regard to required safety and mission assurance for different classes of missions. For the class B payloads of New Frontiers, it would be perhaps more useful to the proposing teams to describe what is not required. Appendix B of NPR 8705.4, despite its title, does not provide safety and mission assurance requirements for missions. It provides recommendations, guidelines and valuable discussions of issues relevant to mission assurance and safety. And while the Marshall program office created the New Frontiers Program Safety and Mission Assurance Guidelines and Requirements - NWFR-RQMT – 0002 with a few dozen requirements on parts, reviews, plans and analyses it still points back to appendix B of NPR 8705.4 for S&MA requirements.

52. Q. Will the science objectives listed in the Draft New Frontiers AO be interpreted narrowly as Level 1 Requirements for the purpose of evaluating Scientific Merit and Relevance, or broadly as themes to be further developed by the proposing teams?
    A. Level 1 requirements are agreements between the project and NASA Headquarters. They are not specified in the AO.

53. Comment: The description of the South Pole-Aitken Basin Sample Return mission in the draft New Frontiers AO deviates from the 2003 Decadal Survey description in that the draft AO description focuses on the return of samples of the deep crust of

the Moon instead of on samples that would be useful to determine the chronology of the basin and so test the early flux of large impactors in the inner solar system. The objectives as listed in the draft AO are OK, but the text in the fore and aft paragraphs should be revised to be consistent with the Decadal Survey, which focused on solar-system-scale issues in its ranking of the SPA-SR mission.
A. The description of the South Pole-Aitken Basin Sample Return Mission has been modified in the AO, but we note that with this and all other mission opportunities the language of Requirement 1 obtains for all proposed investigations; particularly, "Proposals shall clearly justify the choice of science objectives that the proposed science investigation and mission can address; among other rationales, the choice of science objectives shall be justified in terms of science return for a New Frontiers class mission."

54. Comment: The specific science goals for the Comet Surface Sample Return Mission are not consistent with the title and intent of that mission. There is no requirement to return a sample. The six stated science goals could be addressed with a well-instrumented orbiter mission. I suggest the following science goals for the Comet Surface Sample Return Mission:1) Return a sample of 100 to 500 cc of material, collected from the surface of a cometary nucleus, for analysis in terrestrial laboratories; 2) Document the sample site(s) and the sample collection process; 3) Determine the elemental, isotopic, organic, and mineralogical composition of cometary materials; 4) Determine the macroscopic mineralogical and crystalline/amorphous structures and isotopic ratios in cometary solids; 5) Determine the content and nature of pre-solar and inner solar system materials in cometary solids; and 6) Investigate the distribution, abundance, chiral and isotopic composition of pre-biotic organic compounds in comets and the implications for the origin of life on Earth.
A. The description of the Comet Surface Sample Return Mission has been modified in the AO, to clarify that samples must, indeed, be returned. . We have however, essentially preserved the NOSSE science objectives.

55. Q. Can you clarify which specific Launch Vehicles fall into the lowest, medium, and highest performance ranges? In particular, does the Atlas-V 521 fall into the category of lowest performance range, medium performance range, highest performance range? Also, it would be ideal if you would explicitly state the LV credit for each possible launch vehicle configuration within the available EELV family.

    A: It is not possible to specify launch vehicle configurations at this time. Through 2012, NASA procures launch vehicles via the NASA Launch Services (NLS) contract; NF3 will be procured under the follow-on contract, which is not in place yet. The AO contains performance ranges in the intermediate class that we felt were credible for the NF3 mission. The vehicles on the current NLS contract that support this intermediate performance class are the Falcon 9, the Delta IV, and the Atlas V. Due to the competitive nature of NLS, we find it best to only talk in terms of performance class until the mission actually procures the vehicle, which is about

3 years before launch. Which vehicle on the current NLS contract that can actually support a particular mission requirement set can be determined using the ELV performance web site referenced in the ELV Launch Services Information Summary letter. However, as stated in the AO, we discourage designing your spacecraft/mission to a specific launch vehicle, as that launch vehicle configuration cannot be guaranteed. The rationale for doing so must be compelling.

Due to the uncertainty in available launch vehicles several years from now and other uncertainty factors affecting launch vehicle costs, we chose to establish the performance ranges and associated cost credit "steps" primarily to isolate the spacecraft organization from these uncertainties while allowing adequate budgetary planning.

56. Q. Can Project Managers be named to more than one proposal?

    A. Yes.

57. Q. It is clear that choices of science goals must be justified/defended in the context of overall science value. Is it also necessary to explicitly justify not choosing to include one or more of the NOSSE science goals in my proposal?
    A. No.

58. Comment: Require a "preponderance" instead of a "majority" of science objectives for each of the eight mission concepts. A dictionary definition of preponderance is "a superiority in weight, power, importance, or strength." The use of preponderance therefore recognizes that not all science objectives are of equal scientific weight.
    A. Requirement 1 and the descriptions of all eight mission concepts have been modified by substituting "preponderance" for "majority" and providing a definition of preponderance.

59. Comment: In the third science objective for the Venus In Situ Explorer (Section 2.4.2), the words "for example" have been dropped. This explicitly defines the objective as requiring two specific investigations: near-IR descent imaging and surface sampling. This small change has the effect of going against Recommendation 1 of the NOSSE committee: "In drafting the rules for the next New Frontiers announcement of opportunity, NASA should emphasize the science objectives and questions to be addressed, and not specify measurements or techniques for the implementation." Preserving the wording of the NOSSE report here, as elsewhere in the AO, is more in keeping with its intent.
    A. The description of the Venus In Situ Explorer has been modified in the AO to eliminate implied implementations in the Science Objectives.

60. Comment: Under Section 2.4.4 of the draft AO, the Network Science goals are greatly reduced and identified specifically for Mars. A number of the objectives listed in the NOSSE report, which were drawn from the decadal survey, are included in the draft AO only as supplementary measurements. The draft AO states

that network science missions will be considered for "all terrestrial bodies, except Earth." However, because the science objectives described as having the highest priority are specific to Mars, the current version of the AO does not make it clear how missions to other targets would be assessed in terms of achieving the majority of the stated objectives.
A. We believe that, despite the apparent focus on Mars, it would be possible for a proposing team that wishes to propose a Venus or Mercury Network mission to respond to a preponderance of the Science Objectives.

61. Comment: The last two sentences in the Io and Ganymede Observer sections of the draft AO (2.4.7 and 2.4.8) appear to contradict each other: "It is likely that there are more objectives here than can be included in a single New Frontiers mission; proposals must state the science goals for the proposed investigation and provide a rationale for the choice of science objectives. Any mission architecture that achieves the majority of the science objectives stated above for a cost within the New Frontiers cost cap will be considered responsive to this AO." The last sentence is the standard text included for all of the missions but, given how many possible objectives are listed for Io and Ganymede, when taken together with the preceding sentence it may complicate assessment of such missions.
A. The descriptions of the Io and Ganymede Observes have been extensively modified, and the preponderance language now applicable to all potential missions should address the concerns raised here.

62. Q. Why is "Rover" in the name "Asteroid Rover/Sample Return," given that a rover is never mentioned in the objectives for the mission? We recommend deleting any reference to a rover.
A. the term "Rover" has been preserved in the title to retain a linkage to the findings of the NOSSE report, although NASA does not require proposers to use a rover

63. Q. Various line items are discussed as percentages of the PI-Managed Cost cap. Are those percentages of $650M, or are they percentages of the cost cap after credits are applied, *e.g.* for lower capacity launch vehicles? If the latter, that means that a A.
A. The minimum allowable core E/PO program (Section 5.5.2) and the student collaboration incentive (Section 5.5.3) have been clearly defined to be 1% before any cost cap adjustments.

64. Comment: The draft AO refers often to data analysis but infrequently to sample analysis, although three of the eight NF3 mission concepts are sample returns. Paragraph (4.4.1) says that the scientific objectives must be completed in Phase E. That is in contradiction to 7120.5D, which puts all sample analysis in Phase F, assuming sample analysis is required to meet the objectives. Similarly, Requirements 4, 5, and 6 on pg. 17 make no mention of samples, only data. There is no apparent requirement that connects the samples and sample analysis to the achievement of science objectives. There are only requirements on the sample curation, sample contributions, sample cataloging for access, and planetary protection. In the description of Category I on pg. 47, only data is discussed. Not

samples. Traceability of science objectives always refers to tracing down only to instruments, never to samples (e.g. Requirement B-17 on B-9), etc. Overall the draft AO is geared heavily towards traditional missions that return all of their science through bits, not samples. As a result there are holes and ambiguities in the requirements with respect to how to address sample science, or even whether sample analysis to meet the science objectives, beyond a "preliminary examination", is expected as part of the mission cost.
A. (i) Samples are a form of data. Sample analysis is a form of data analysis. All requirements for data and data analysis also apply to samples and sample analysis. (ii) This AO, like all AOs, is a Broad Agency Announcement not a Request for Proposals (RFP). That means the requirements are written broadly to permit the proposer to apply them appropriately to the proposed investigation. NASA does not write tightly constraining requirements – especially in science and data analysis – so as to not constrain the ability of the science community to propose the best science missions. NASA expects proposers to define their own science objectives, measurement requirements, and even their own sample requirements. (iii) The AO has been clarified to require the analysis of both data and samples (both of which are in Phase F according to NPR 7120.5D

65. Q. In Section 4.5.1, NASA IV&V is mentioned as not being part of the PI-Managed Mission Cost. But is it part of the Total Mission Cost, *i.e.* a contribution external to NF? If so, should it be estimated somehow to calculate the Total Mission Cost? Same question for CADRe on pg. 16, 4.5.3.
A. No, these costs should not be included in the Total Mission Cost. Note that there is no requirement in the AO to include them in the Total Mission Cost. They are NASA institutional costs, just like the cost of the New Frontiers Program Office and the other NASA offices that will support the selected mission.

66. Q. Section 4.5.2 states that the contractor EVM system must be validated by the "cognizant Federal management agency". Does this mean that some agency other than NASA would be validating the EVM system? How would one know what the "cognizant Federal management agency" is for a given contractor?
A. The Defense Contract Management Agency (DCMA) is the organization that typically certifies contractor EVM systems. One would need to check with the contractor to see if they are an exception to that statement.